Amendments to the Specification:

Delete the entire specification and replace it with the following specification.

HEAT FAN

ABSTRACT

A fan with heated circulating blades which includes a longitudinally extending heating element mounted in a slot defined extending along the surface of some of the fan blades for heating of air blow outwardly therefrom. A resilient biasing device such as a flat spring is mounted at various location in the fan blades to bias the heating element into the slot for retaining it therewithin. A ball bearing configuration is included for providing electrical power to the heating elements while the fan rotates. A bearing apparatus is included with at least two bearings each individually maintained in electrically conductive abutment with respect to conductive rings mounted within the fan hub electrically insulated from each other. Each ring is electrically conductive with respect to one end of each heating element in each blade for heating thereof particularly during fan rotation.

BACKGROUND OF THE INVENTION

Typically electric fans have been used to circulate air flow for cooling otherwise ambient environments. Other heaters have been used to provide supplementary heat in various areas by forcing air flow through heating elements wherein the air is warm by the heater as it is forces to move through the heaing element by the fan. It is difficult to provide such constructions which are usage with fans that can oscillate, which are more useful in providing air circulation than stationary fans or blowers. Some electrically heated devices have been used to heat areas by placing a swivel fan in front of the heated element but this results in limited air circulation throughout the area. The construction fo the present invention of heat fan provides cost effective circulation of heated air which is usable in many different environmental areas. It has enhanced heating and air circulation capabilities which is usable in almost any ambient environment.

SUMMARY OF THE INVENTION

Temperature control by used of a unique heated fan is a primary advantage of the present invention. Control of air flow and temperature of the surrounding environment is made possible. Operation of the fan will gradually increase the temperature of surrounding air to reach the desirable temperature. Its unique construction and function is possible because of the particular designing of the fan and hub which allows the delivering of electrical current through sealed metal ballbearings to heating elements at least partially embedded in the fan blades.

The fan can rotate and deliver electric current to the heating elements at the same time. The advantage of delivering electric current through the metal ball bearings to the heating elements on the rotating embedded blades is one of the principles of this invention. This method is particularly advanced in its simplicity, cost and effectiveness. It should be noted that this invention is based on the principal of using a ball bearing sealed wheel or otherwise to act as a electricity conductive member to supply to the heating element embedded on the blade thus warming the blade creating hotter air exhaustive. Proper safety precautions have been adhered to in this design as required by Underwriter's Laboratory. This fan may be used for all seasons by adjusting the control device deactivating the heating element when not necessary, thus enabling the fan to be used as a regular fan.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 An perspective illustration of an electric fan constructed in accordance with the present invention;

Fig. 2 An assembly view of the housing cover, sealed bearing construction and rlrvtrivsl flow path of an embodiment of the present invention;

Fig. 3 A front plan view of an embodiment of a fanof the present invention showing the positioning of heating elements embedded therein;

Fig. 4 A side cross-sectional view of an embodiment of the present invention showing the flow path of electrical current through the hub construction to supply electrical current to the heating element embedded in the fan blades;

Fig. 5 A perspective illustration of an embodiment of the rotatable center hub with blade mounting locations;

Fig. 6 A front plan view of an embodiment of the construction of the fan blade and center hub showing current flow paths therethrough;

Fig. 7 A perspective illustration of the electrical line, tubular conductor and ball bearing usable for establishing a current flow delivery path;

Fig. 8 A schematic illustration of an embodiment of the control panel of the present invention;

Fig. 9 A perspective illustration of a fan made in accordance with the present invention showing the flow of colder air toward the rotating fan and the flow of warmer air away away therefrom;

Fig. 10 a schematic illustration of the electrical system of an embodiment of the present invention;

Fig. 11 is a cross-sectional view of a portion of the fan blade and heating element of an embodiment of the present invention showing the heating element at least partially embedded into the slot defined in the fan blade surface; and

Fig. 12 is a front view of an embodiment of the fan of the present invention showing positioning of the brackets with bow springs that retain the heating element embedded within the fan blade.

DETAILED DESCRIPTION OF THE EMBODIMENTS

The present invention provides a unique configuration for a rotatable heating fan 1 which is controlled by a panel board 2 including a plurality of selection buttons for operation thereof. Each heating fan includes a plurality of fan blades 3 preferably made of aluminum.

Each fan 1 is constructed with a center hub 4 preferably of ceramic material to facilitate electrical insulation of the components contained therewith. A drive motor 80 is included mounted within a motor housing 6 with a driveshaft 82 extending outwardly therefrom and secured to the fan hub 4 to facilitate rotational driving of fan 1. The motor housing 6 preferably includes an opening therein with a housing cover plate or mounting plate 5 extending thereof. Said driveshaft 82 preferably extends through said mounting plate 5 as best shown in Figure 2. Electrical conductors or collets are mounted in the mounting plate 5 for conducting electrical current flow therethrough. Preferably the present invention will include a first insulating collet or electrical conductor 10 and a second insulating collet or electrical conductor 11 electrically insulated from one another. Also includes can be a tighteneing collet log 9. Preferably the the insulated conducting collets or posts can include vinyl coating 8 thereon for electrical insulation thereof. The first electrical conductor 10 preferably includes a first ball bearing 66 secured thereto and adapted to be rotatable therewith. Similarly, the second electrical conductor 11 preferably includes a second ball bearing 66 secured thereto and adapted to be rotatable therewith. Electrically conducting lines 12 extend to each individual electrical conductor 10 and 11. Electrical supply lines provide a source of electrical current to the electrically conducting lines 12. The conductive posts are generally refered to as reference numeral 17.

Each fan 1 defines a slot 84 extending over the surface of each fan blade 3 or at least over a portion thereof. These slots 84 are designed to receive a heating element 20 embedded therein or extending at least partially therein as shown best in Figure 11. Brackets 78 are mounted in the fan blades 3 adjacent said slots 84 and extend over the adjacent heating element 20 for facilitating retaining thereof within slots 84. These brackets 78 can preferably be flexibly resilient and

configured as bows springs or flat springs as shown best in Figure 11. With this construction, cool air 40 drawn adjacent to fan 1 will be expelled therefrom as hotter air 50.

An important characteristic of the present invention is in the internal construction of the hub 4 which facilitates maintaining electrical connection with the power source during rotation of the fan 1. This capability is made possible by a unique construction. Each of the first electrical conductor 10 and 11 will include a ball bearing 66 and 68 mounted thereon respectively. The hub 4 includes a first ring 70 and a second ring 72 mounted therewith electrically insurated from one another. The first ball bearing 66 is maintained in electrical contact with first ring 70 during fan rotation and the second ball bearing 68 is maintained in electrical contact with the second ring 72 during fan rotation. Each heating element 20 includes two ends 23 defined thereon. First ring 70 is electrically connected to each of the first heating ends 74 of each heating element 20 of each fan blade 3. Second ring 72 is electrically connected to each of the second heating ends 76 of each heating element 20 of each fan blade 3. As the fan is powered for rotation contact is maintained between each conducting ball bearing and the immediately adjacent ring. In this manner electrical current flow is maintained through all of the heating elements 20 located on each fan blade 3 during rotation of fan 1. This construction is best shown in Figure 4 where each bearing 66 and 68 is shown extending outwardly from the mounting plate at a different length to facilitate abutment thereof with respect to the immediately adjacent ring for maintaince of electrical contact therewith. The hub 4 can include a rubber or ceramic insulating liner to facilitate electrical insulation of the rings mounted therewithin. Preferably a rubber-type insulation will be used preferably with a silicone component. A silicone based rubber-type material found to be useful for this purpose is a two part curable material commonly known as QSI available through SET Silicone and Epoxy Technology of Long Island, New York.

Connecting means 21 is used to mount the individual fan blade 3 as shown in Figure 3. conductive springs 23a can be included on the ends 23 of the heating elements 20. The conductive path is shown as reference 21 in Figure 3 and 6. In Figure 8 plug 31 is used to connect to a main source of electrical power. Figure 8 also shows the various options 25, 26, 27, 28 and 29 for the selection buttons of the panel board 2.